

CLAIMS

- 1 1. A method to detect one or a plurality of defective pixels in a spatial light
2 modulator, comprising the actions of:
- 3 - providing an electromagnetic radiation source to illuminate said spatial light
4 modulator,
- 5 - arranging a reference pattern in said spatial light modulator,
- 6 - illuminating said spatial light modulator,
- 7 - determining a position of a reference pixel in said spatial light modulator by
8 detecting a relayed image of said reference pattern in a detector arrangement,
- 9 - arranging a first pattern in said spatial light modulator,
- 10 - illuminating said spatial light modulator,
- 11 - detecting a relayed image of said first pattern in said detector arrangement,
- 12 - arranging at least a second pattern in said spatial light modulator,
- 13 - illuminating said spatial light modulator,
- 14 - detecting a relayed image of said at least a second pattern in said spatial light
15 modulator
- 16 - analyzing said relayed images of said first pattern and said at least a second
17 pattern to detect differences between said images and theoretical images
18 thereof.

- 1 2. The method according to claim 1, wherein said first and second patterns are
2 chessboard patterns, where the first chessboard pattern is inverted to the second
3 chessboard pattern.

- 1 3. The method according to claim 1, wherein the relayed image is detected by a CCD
2 camera.

- 1 4. The method according to claim 3, wherein the projection of a SLM pixel is bigger
2 than a CCD pixel.
- 1 5. The method according to claim 1, wherein single pixels in the spatial light
2 modulator are not resolved in said detector.
- 1 6. The method according to claim 5, wherein a spatial filter between the detector and
2 the spatial light modulator is adapted to vary the degree of resolution on said detector.
- 1 7. The method according to claim 1, wherein at least one of said first and second
2 patterns is detected by illuminating said pattern at least twice and detecting the
3 relayed images separately.
- 1 8. The method according to claim 1, wherein at least one of said first and second
2 patterns is comprised of only non deflected and fully deflected pixels.
- 1 9. The method according to claim 8, wherein said fully deflected pixels corresponds
2 to a maximum degree of extinction by means of diffraction.
- 1 10. The method according to claim 2, wherein said chessboard patterns are comprised
2 of only non-deflected and fully deflected pixels.
- 1 11. The method according to claim 2, wherein said chessboard patterns are comprised
2 of only non-deflected and partially deflected pixels.
- 1 12. The method according to claim 10, wherein said fully deflected pixels corresponds
2 to a maximum degree of extinction by means of diffraction.
- 1 13. The method according to claim 11, wherein said partially deflected pixels
2 corresponds to partial extinction by means of diffraction.
- 1 14. The method according to claim 2, wherein said first and second patterns are each
2 detected a plurality of times, where the pixels in said patterns are set to different
3 degrees of deflection before each detection event.
- 1 15. The method according to claim 2, wherein said chessboard patterns are comprised
2 of only fully-deflected and partially deflected pixels.

1 16. The method according to claim 2, wherein said chessboard patterns are comprised
2 of pixels being in a first partially deflected state and a second partially deflected state.

1 17. A method to detect at least one defective pixel in a spatial light modulator
2 comprising numerous pixel elements, comprising the actions of:

- 3 - detecting a relayed image of a first chessboard pattern of pixels in said spatial
4 light modulator by said detector,
- 5 - detecting a relayed image of a second chessboard pattern of pixels in said
6 spatial light modulator, which is inverted to the first chessboard pattern, by
7 said detector,
- 8 - analyzing the relayed images of said first and second chessboard patterns to
9 detect differences between said detected images and theoretical images
10 thereof.

1 18. The method according to claim 17, wherein the relayed images are detected by a
2 CCD camera.

1 19. The method according to claim 18, wherein the projection of a SLM pixel is
2 bigger than a CCD pixel.

1 20. The method according to claim 17, wherein single pixels in the spatial light
2 modulator are not resolved in said detector.

1 21. The method according to claim 20, wherein a spatial filter between the detector
2 and the spatial light modulator is adapted to vary the degree of resolution of said
3 relayed image on said detector.

1 22. The method according to claim 17, wherein at least one of said first and second
2 patterns is detected by illuminating said pattern at least twice and detecting the
3 relayed images separately.

1 23. The method according to claim 17, wherein said chessboard patterns are
2 comprised of only non-deflected and fully deflected pixels.

- 1 24. The method according to claim 17, wherein said chessboard patterns are
2 comprised of only non-deflected and partially deflected pixels.
- 1 25. The method according to claim 23, wherein said fully deflected pixels corresponds
2 to a maximum degree of extinction by means of diffraction.
- 1 26. The method according to claim 24, wherein said partially deflected pixels
2 corresponds to partial extinction by means of diffraction.
- 1 27. The method according to claim 17, wherein said first and second patterns are each
2 detected a plurality of times, where the pixels in said patterns are set to different
3 degrees of deflection before each detection event.
- 1 28. The method according to claim 17, wherein said chessboard patterns are
2 comprised of only fully-deflected and partially deflected pixels.
- 1 29. The method according to claim 17, wherein said chessboard patterns are
2 comprised of pixels being in a first partially deflected state and a second partially
3 deflected state.
- 1 30. The method according to claim 17, further comprising the action of:
2 - identifying a SLM reference pixel in a detector pixel grid.
- 1 31. A method to detect at least one defective pixel in a spatial light modulator,
2 comprising the action of:
3 - making an image of a first chessboard pattern unsharp so that a regular
4 chessboard pattern becomes a uniform background at a detector plane and a
5 defective pixel becomes an irregularity in said uniform background at said
6 plane and detectable by a detector.
- 1 32. The method according to claim 31, further comprising the action of:
2 - making an image of a second chessboard pattern, which second pattern is
3 inverted to said first pattern, unsharp so that a regular chessboard pattern
4 becomes a uniform background at a detector plane and a defective pixel

5 becomes an irregularity in said uniform background at said plane and
6 detectable by a detector.

1 33. The method according to claim 31, wherein said detector is a CCD camera.

1 34. The method according to claim 33, wherein a projection of a SLM pixel onto said
2 CCD is bigger than a CCD pixel.

1 35. The method according to claim 31, wherein said chessboard pattern is comprised
2 of only non-deflected and fully deflected pixels.

1 36. The method according to claim 31, wherein said chessboard pattern is comprised
2 of only non-deflected and partially deflected pixels.

1 37. The method according to claim 35, wherein said fully deflected pixels corresponds
2 to a maximum degree of extinction by means of diffraction.

1 38. The method according to claim 36, wherein said partially deflected pixels
2 corresponds to partial extinction by means of diffraction.

1 39. The method according to claim 31, wherein said chessboard pattern is comprised
2 of only fully-deflected and partially deflected pixels.

1 40. The method according to claim 17, wherein said chessboard pattern is comprised
2 of pixels being in a first partially deflected state and a second partially deflected state.

1 41. The method according to claim 32, wherein said chessboard pattern is comprised
2 of only non-deflected and fully deflected pixels.

1 42. The method according to claim 32, wherein said chessboard pattern is comprised
2 of only non-deflected and partially deflected pixels.

1 43. The method according to claim 41, wherein said fully deflected pixels corresponds
2 to a maximum degree of extinction by means of diffraction.

1 44. The method according to claim 42, wherein said partially deflected pixels
2 corresponds to partial extinction by means of diffraction.

- 1 45. The method according to claim 32, wherein said chessboard pattern is comprised
2 of only fully-deflected and partially deflected pixels.
- 1 46. The method according to claim 32, wherein said chessboard pattern is comprised
2 of pixels being in a first partially deflected state and a second partially deflected state.
- 1 47. The method according to claim 31, further comprising the action of:
2 identifying an SLM reference pixel in a detector pixel grid.